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ABSTRACT

The effectiveness of the inductive instructional method of general case programming was compared to the deductive approach of rule learning, in attempting to facilitate generalized learning and maintenance of a community living skill for adults with mental retardation. The impact of functional ability on the type of instruction was also assessed. Thirty-six adults were randomly assigned to one of three conditions (rule, general case, or control) and were designated as high or low functioning based on a median split from their pretest performance on a tablesetting task. The findings, following training on tablesetting tasks, indicate that both general case programming and rule learning were effective for those in the higher functioning group, but only general case programming was effective in promoting generalization and maintenance for those in the lower functioning group. Generalized skill performance was maintained at a 1-month followup. Performance of trained participants in the high-functioning group was comparable to the tablesetting ability of the nondisabled. Those in the low-functioning group, however, did not show comparable performance irrespective of training. (JDD)

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# INSTRUCTIONAL METHODS FOR GENERALIZED LEARNING FOR ADULTS WITH MENTAL RETARDATION

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## ABSTRACT

THE PRESENT STUDY HAS COMPARED THE EFFECTIVENESS OF THE INDUCTIVE INSTRUCTIONAL METHOD OF GENERAL CASE PROGRAMMING AND THE DEDUCTIVE APPROACH OF RULE LEARNING IN ATTEMPTING TO FACILITATE GENERALIZED LEARNING AND MAINTENANCE OF A COMMUNITY LIVING SKILL FOR INDIVIDUALS WITH MENTAL RETARDATION. ALSO, THE IMPACT OF FUNCTIONAL ABILITY ON THE TYPE OF INSTRUCTION WAS ASSESSED. THE FINDINGS INDICATE THAT BOTH GENERAL CASE PROGRAMMING AND RULE LEARNING WERE EFFECTIVE FOR THOSE IN THE HIGHER FUNCTIONING GROUP, BUT ONLY GENERAL CASE PROGRAMMING WAS EFFECTIVE IN PROMOTING GENERALIZATION AND MAINTENANCE FOR THOSE IN THE LOWER FUNCTIONING GROUP. THE RESULTS SUPPORT THE NEED FOR A PRESCRIPTIVE APPROACH TO COMMUNITY LIVING SKILLS TRAINING.

## INTRODUCTION

- TRAINING ADULTS WITH MENTAL RETARDATION INDEPENDENT LIVING SKILLS IS DEMANDING BECAUSE:

1. THE COMMUNITY IS A COMPLEX ENVIRONMENT WHERE SKILL DEMANDS SHOW MUCH VARIATION; AND

2. ADULTS WITH MENTAL RETARDATION OFTEN HAVE PROBLEMS WITH GENERALIZED SKILL PERFORMANCE, I.E., ENGAGING IN SKILLS THAT VARY ACROSS CONTEXTS.

## PURPOSE

- TEST THE EFFECTIVENESS OF TWO TRAINING APPROACHES - GENERAL CASE PROGRAMMING VS. RULE LEARNING - DESIGNED TO FOSTER GENERALIZED SKILL PERFORMANCE IN ADULTS WITH MENTAL RETARDATION.

- TEST THE RELATIVE EFFECTIVENESS OF GENERAL CASE PROGRAMMING VS. RULE LEARNING FOR HIGHER AND LOWER FUNCTIONING INDIVIDUALS.

  - RULE LEARNING (GAGNE & BRIGGS, 1979; GAGNE, 1985) IS A DEDUCTIVE APPROACH WHERE A SET OF INTERNALIZED PRESCRIPTIONS FOR BEHAVIOR ARE TAUGHT WHICH CAN BE APPLIED TO REGULATE SKILL PERFORMANCE ACROSS A RANGE OF CONTEXTS.

  - GENERAL CASE PROGRAMMING (HORNER, MCDONNELL & BELLAMY, 1986) IS A MORE INDUCTIVE APPROACH WHERE SEVERAL SPECIFIC EXAMPLES OF A SKILL, WHICH SAMPLE THE SKILL'S RANGE OF VARIATION, ARE TAUGHT TO PRODUCE GENERALIZED SKILL PERFORMANCE ACROSS A RANGE OF CONTEXTS.

## PARTICIPANTS

- SELECTED FROM ADULT ACTIVITY CENTER IN NEW YORK CITY.

- SAMPLE SIZE
  - 36 TOTAL
    - 14 FEMALES
    - 22 MALES

- AGE
  - RANGE = 22-53 Years
  - MEAN = 29 Years
  - STANDARD DEVIATION = 7.25

- IQ
  - RANGE = <20-73
  - MEAN = 42
  - STANDARD DEVIATION = 15.56

- DUAL DIAGNOSES
  - 61% OF SAMPLE USING PSYCHOTROPIC MEDICATIONS, MANY OF WHOM HAVE THE FOLLOWING PSYCHIATRIC DIAGNOSES: CHRONIC SCHIZOPHRENIA, CHILDHOOD SCHIZOPHRENIA, PERVASIVE DEVELOPMENTAL DISORDER, ATYPICAL PSYCHOSIS, ORGANIC AFFECTIVE DISORDER, AUTISM, BRAIN DAMAGE ASSOCIATED WITH BEHAVIOR DISORDER.

## DESIGN

A REPEATED MEASURES, TWO (HIGH AND LOW FUNCTIONING GROUPS) BY THREE (RULE, GENERAL CASE, AND CONTROL CONDITIONS) FACTORIAL DESIGN WITH SIX PARTICIPANTS PER CELL. (See Table 1).

- HIGH AND LOW GROUPS - BASED ON MEDIAN SPLIT FROM PRE-TEST PERFORMANCE ON TABLESETTING

- RULE, GENERAL CASE & CONTROL CONDITIONS - ALL 36 PARTICIPANTS WERE RANDOMLY ASSIGNED TO ONE OF THREE CONDITIONS.

DEPENDENT VARIABLES:

1. GENERALIZATION OR GENERALIZED LEARNING - APPLICATION OF SKILL TRAINING TO SEVERAL NON-TRAINED NATURALISTIC SITUATIONS.

2. MAINTENANCE - PERFORMANCE OF GENERALIZED LEARNING AFTER TRAINING HAS TERMINATED FOR FOUR WEEKS.

Table 1
REPEATED MEASURES 2 X 3 FACTORIAL DESIGN

| | | GENERALIZATION | MAINTENANCE |
|---|---|---|---|
| GENERAL CASE PROGRAMMING | HIGH | Participants 1-6 | Participants 1-6 |
| | LOW | Participants 7-12 | Participants 7-12 |
| RULE INSTRUCTION | HIGH | Participants 13-18 | Participants 13-18 |
| | LOW | Participants 19-24 | Participants 19-24 |
| CONTROL CONDITION | HIGH | Participants 25-30 | Participants 25-30 |
| | LOW | Participants 31-36 | Participants 31-36 |

## PROCEDURE

**EVALUATION**

**PRE-TEST**: BASELINE OF TABLESETTING
**POST-TEST**: TEST FOR GENERALIZED LEARNING OF TABLESETTING
**FOLLOW-UP**: TEST FOR MAINTENANCE OF GENERALIZED LEARNING FOUR WEEKS LATER

**TRAINING**

**RULE INSTRUCTION**
**GENERAL CASE PROGRAMMING**
**CONTROL CONDITION**

**EVALUATION**

- ADMINISTRATION OF FIVE TASK ANALYZED TABLESETTING PROBES IN KITCHEN AND DININGROOM OF TRAINING APARTMENT WHICH ARE BASED ON THE INSTRUCTIONAL UNIVERSE*

- **DATA COLLECTED** - CORRECTNESS OF EACH TABLESETTING STEP FOR EACH PROBE.

- **INSTRUCTIONS** - SHOW MENU CARD DEPICTING FOODS; DESCRIBE MEAL WITH INFORMATION CONCERNING FOODS, NUMBER OF DINERS, AND FORMALITY OF MEAL.

- **INTER-OBSERVER AGREEMENT** - COLLECTED AT THREE EVALUATION PHASES.

- **SOCIAL VALIDITY** - ADMINISTRATION OF SAME DEPENDENT VARIABLE NON-DISABLED ADULTS.

**TRAINING**

- FOUR GROUPS OF SIX PARTICIPANTS RECEIVED TABLESETTING TRAINING TWICE A WEEK FOR EIGHT MONTHS.

- WHILE ONE GROUP WAS TRAINED, OTHERS RECEIVED REGULAR ACTIVITIES AT THE DAY ACTIVITY CENTER.

- BASIC TRAINING PROCEDURES: MODELING, SOCIAL REINFORCEMENT, POSITIVE AND NEGATIVE EXAMPLES, AND PEER INSTRUCTION AND FEEDBACK.

- ALL GROUPS WERE EQUATED FOR TIME IN TRAINING.

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*INSTRUCTIONAL UNIVERSE
FULL RANGE OF SITUATIONS WHERE THE SKILL WOULD BE EXPECTED TO BE PERFORMED FOR EACH STUDENT.

**RULE INSTRUCTION**

- PRESENTATION OF GENERAL KNOWLEDGE REGARDING TABLESETTING VIA VERBALIZATION AND DEMONSTRATION OF DISCRIMINATIONS, CONCEPTS, AND RULES TAUGHT IN A HIERARCHICAL FASHION.

- **CURRICULUM** - 14 TABLESETTING UNITS (NINE SELECTING AND FIVE ARRANGING) BASED ON THE INSTRUCTIONAL UNIVERSE.

- **SPECIFIC PROCEDURES** - INDIVIDUAL AND GROUP RECITATION AND DEMONSTRATION OF RULES; PRESENTATION OF ONE RULE AT A TIME OR IN CLUSTERS BASED OF FOOD CONCEPTS.

**GENERAL CASE PROGRAMMING**

- TEACHING SPECIFIC TABLESETTING EXAMPLES WHICH SAMPLE THE RANGE OF STIMULUS AND RESPONSE VARIATION WITHIN THE INSTRUCTIONAL UNIVERSE.

- **CURRICULUM** - FIVE TASK ANALYZED TABLESETTING EXAMPLES WHICH SAMPLE THE RANGE OF TYPES OF MEALS, FOODS, FORMALITY OF MEAL, AND NUMBER OF DINERS.

- **SPECIFIC PROCEDURES** - SEQUENCING AND JUXTAPOSITIONING OF EXAMPLES FOR DISCRIMINATION LEARNING; AND GROUP SELECTING AND/OR ARRANGING ITEMS FOR ENTIRE MENU WITH INDIVIDUALS PERFORMING MANY STEPS.

**CONTROL CONDITION**

- **ATTENTION CONTROL** - PARTICIPANTS UTILIZED APARTMENT FOR ACTIVITIES NOT RELATED TO TRAINED SKILL, E.G., ARTS & CRAFTS, BEDMAKING, & EXERCISING

## RESULTS

### ANALYSIS.

- REPEATED MEASURES FACTORIAL ANALYSIS OF VARIANCE
  TWO BETWEEN FACTORS
  : TREATMENT - GENERAL CASE, RULE, CONTROL
  : LEVEL - HIGH, LOW
  ONE WITHIN FACTOR
  : TIME - POSTTEST, FOLLOWUP

### RESULTS

- NO EFFECT FOR TIME, $F(1,30)= 0.02$, $p=.89$
- SIGNIFICANT TREATMENT X LEVEL INTERACTION, $F(2,30)=2.94$, $p=.07$) (See Figure 1).

### ANALYSES OF LEVEL X TREATMENT INTERACTION

- SIX MULTIPLE COMPARISONS OF CELL MEANS.
- TREATMENT MEANS WERE COMPARED AT EACH LEVEL. (See Table 2).
- SIGNIFICANCE LEVELS WERE ADJUSTED UTILIZING BONFERRONI CRITERION.
  BONFERRONI CRITERION = ALPHA DIVIDED BY NUMBER OF COMPARISONS.

**Figure 1**
**LEVEL BY TREATMENT INTERACTION**

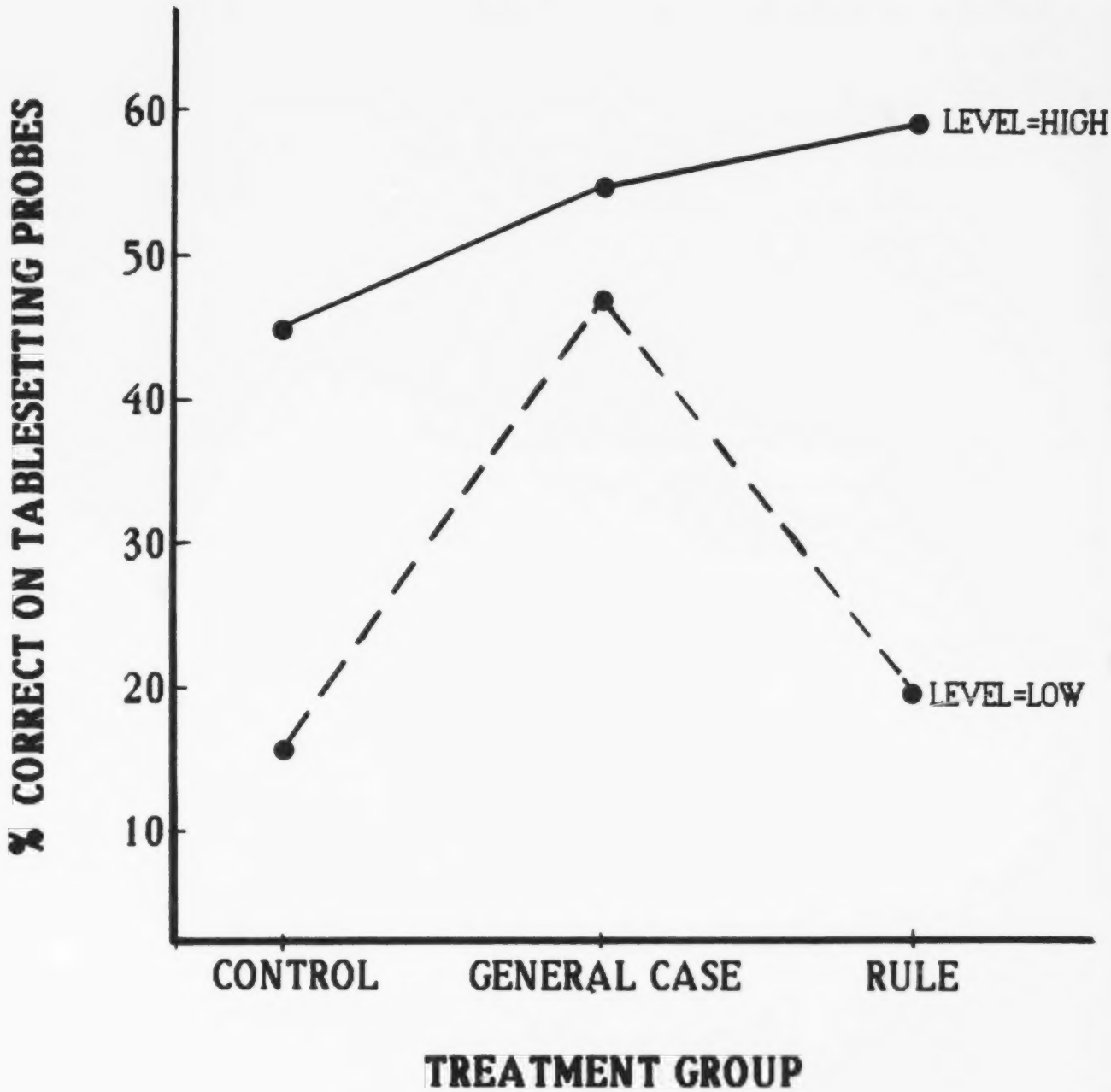

Table 2
TREATMENT COMPARISONS BY LEVEL
(F values)

| TREATMENT COMPARISON | LEVEL HIGH | LEVEL LOW |
|---|---|---|
| GENERAL CASE vs. CONTROL | 8.50* | 14.21** |
| RULE vs. CONTROL | 10.75* | 0.69 |
| GENERAL CASE vs. RULE | 1.33 | 8.65* |

df = 1,30
* significant at Bonferroni adjusted .05 level
** significant at Bonferroni adjusted .01 level

## INTEROBSERVER AGREEMENT

- % AGREEMENT = $\frac{\text{NUMBER OF AGREEMENTS}}{\text{TOTAL POSSIBLE}}$ X 100

- COLLECTED ON >30% OF DATA AT EACH PHASE

- % AGREEMENT FOR EACH PHASE:

| | | |
|---|---|---|
| BASELINE | MEAN=97% | RANGE=93-100% |
| GENERALIZATION | MEAN=97% | RANGE=94-99% |
| MAINTENANCE | MEAN=98% | RANGE=97-100% |

## SOCIAL VALIDITY

- % CORRECT = $\frac{\text{NUMBER OF CORRECT STEPS}}{\text{TOTAL STEPS}}$ X 100

- COLLECTED FOR SEVEN NON-DISABLED ADULTS (FIVE MALES AND TWO FEMALES) WITH MEAN AGE OF 32 (RANGE FROM 24 TO 52 YEARS).

- MEAN FOR GROUP = 58% CORRECT

- STANDARD DEVIATION = 12.9

## SUMMARY

- HIGHER FUNCTIONING INDIVIDUALS BENEFITTED FROM BOTH GENERAL CASE PROGRAMMING AND RULE LEARNING.
- LOWER FUNCTIONING INDIVIDUALS BENEFITTED ONLY FROM GENERAL CASE PROGRAMMING.
- GENERALIZED SKILL PERFORMANCE WAS MAINTAINED AT A ONE MONTH FOLLOWUP.
- PERFORMANCE OF TRAINED PARTICIPANTS IN THE HIGH GROUP WAS COMPARABLE TO THE TABLESETTING ABILITY OF THE NONDISABLED. THOSE IN THE LOW GROUP, HOWEVER, DID NOT SHOW COMPARABLE PERFORMANCE IRRESPECTIVE OF TRAINING.

## IMPLICATIONS

### PRESCRIPTIVE

- HIGHER FUNCTIONING INDIVIDUALS WITH MENTAL RETARDATION CAN DEMONSTRATE GENERALIZED PERFORMANCE OF SKILLS FOLLOWING RULE TRAINING OR GENERAL CASE PROGRAMMING.
  - FOR THESE PEOPLE, CLASSROOM BASED RULE TRAINING MAY BE MORE DESIRABLE WHEN MORE EFFICIENT IN TERMS OF TIME, STAFFING AND EXPENSE THAN GENERAL CASE PROGRAMMING WHICH REQUIRES INSTRUCTION ON MULTIPLE EXAMPLES OF A SKILL WITHIN NATURALISTIC SETTINGS.
  - ECOLOGICAL VALIDITY: ALTHOUGH CLASSROOM BASED RULE TRAINING CAN BE EFFECTIVE, ONE SHOULD NOT LOSE SIGHT OF THE FACT THAT THE ULTIMATE CRITERION FOR THE SUCCESS OF TRAINING IS SKILL PERFORMANCE IN THE NATURAL ENVIRONMENT.
- INDIVIDUALS WITH FEWER SKILLS BENEFIT ONLY FROM GENERAL CASE PROGRAMMING.
  - IN ORDER TO DEMONSTRATE GENERALIZATION, THEY NEED DIRECT EXPERIENCE PERFORMING A TASK IN SEVERAL DIFFERENT WAYS THAT THE GENERAL CASE PROGRAMMING APPROACH PROVIDES.

### FUTURE RESEARCH

- EXTENSION OF PRESCRIPTIVE RESULTS TO OTHER INDEPENDENT LIVING SKILLS.
- INVESTIGATION OF VARIABLES THAT PREDICT EFFECTIVENESS OF RULE LEARNING IN ORDER TO PROVIDE GUIDELINES FOR ASSIGNING INDIVIDUALS TO TRAINING APPROACHES; E.G., COGNITIVE DEVELOPMENT, INTEREST, ATTENTION, PERSONALITY CHARACTERISTICS.

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